

REMARKS

Claim 1 has been amended, claims 2 and 3 canceled without prejudice and new claims 4-21 are added. Claims 1 and 4-21 are pending. Support for new claims 4-21 is found throughout the Specification, tables therein and the Drawings.

The Office Action mailed April 29, 2005, has been received and its contents carefully reviewed. Applicants have amended the specification of the application to correct various typographical errors and formatting irregularities and otherwise more accurately describe the invention. Applicants have amended the drawings and the specification describing the drawings to comply with the Examiner's requests. Applicants have amended claim 1 to clarify the antecedent basis of the claim and for clarity. By these amendments, Applicants respectfully submit that they have added no new matter. Applicants respectfully request reconsideration of this application in light of the above and the following remarks.

A. Objections

In the Official Action, the Examiner has objected to the drawings. Figures 1 and 2 have been amended to properly label the drawings as Figures 1A and 1B, and as Prior Art. Figures 2A and 2B have also been amended to properly label the drawings, and to better describe the figures. Corresponding amendments were made in the substitute specification to accurately describe the figures, including Figures 1A and 1B, Figures 2A and 2B, and Figure 4. Also, the heading "CONCLUSIONS" was deleted from the specification, as per the Examiner's suggestion. In view of these changes, Applicants respectfully request that the objections be withdrawn.

In an effort to further clarify the invention, the Brief Description of the Drawings has been amended for clarity pursuant to the above. Several additional formatting modifications have been made to better accord with U.S. Patent and Trademark Office requirements, e.g., the addition of line numbering and an Abstract, and proper formulaic references to various values employed in the innovation have been made.

All of the above modifications are set forth hereinabove and in the substitute and marked-up Specifications, also submitted herewith. Applicants respectfully submit that no new matter has been introduced in this Response.

B. 35 U.S.C. § 112 Rejections

Claims 1-3 stand rejected under 35 U.S.C. § 112. Applicants have amended claim 1 to clarify the antecedent basis of the claim elements pursuant to the Examiner's request, and for clarity. Applicants respectfully request that the §112 rejection be withdrawn.

C. 35 U.S.C. § 102 Rejection

Claims 1-3 also stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,828,590 to Chen et al. (hereinafter "Chen"). Applicants respectfully traverse the rejection.

Chen is generally directed toward a method of multiplication without carry propagation. Specifically, Chen describes a method of multiplier coding to create partial products by expressing a number and recoding it to a radix_4 number, where y_i is the set of $\{0, \pm 1, \pm 2\}$, or by recoding it to a radix_8 number, where y_i is the set of $\{0, \pm 1, \pm 2, \pm 3, \pm 4\}$. However, at y_i at ± 3 , to decrease the partial products, the number is recoded to a radix_4 number.

In contrast, the present invention is directed to a method of multiplier recoding where a number is recoded twice, for example, using a first radix encoding of $\beta = 32$ and a secondary radix of $\gamma = 7$, where digit values are only signed binary powers or zero. The recoding is a three-step process, where, for example, the 6-bit inputs are taken to have certain weights corresponding to a leading 5-bit 2's complement integer followed by a low order bit carry-in. Then, the number is recoded into a single Booth digit using the radix-32 and then as a two digit radix-7 value. Then, the radix-7 digits are encoded using a sign and magnitude select bit encoding. Both the multiplier and multiplicand are recoded in this manner, and then they are multiplied by summing all of the partial products.

Claim 1 of the present invention is directed to an apparatus for higher radix binary multiplication, the apparatus having means for multiplying the multiplicand by weight, means for recoding the multiplier, means for generating partial products of the low-order digits of the multiplier; and means for combining the partial products of the low-order digits of the

multiplier and the partial products of the multiplicand. As described above, claim 1 is directed to an apparatus that recodes each multiplier and multiplicand using two separate radix systems for encoding each number, and reducing the partial products used in the multiplication. Chen makes no mention of using two separate radix systems for each number, instead only mentioning using a second radix system for encoding a number in one case where y_i is ± 3 . The present invention is directed to a system and methodology that uses two separate radices for encoding, and the radices chosen for each number are fixed instead of variable, as in Chen.

Since Chen fails to teach or suggest each and every element recited in independent claim 1, Applicant respectfully submits that Chen does not anticipate the present invention. Furthermore, Applicants respectfully submit that the disclosure of Chen also fails to render the present invention, as claimed, obvious. Therefore, Applicants respectfully request that the rejection of independent claim 1 under 35 U.S.C. § 102(b) over Chen be withdrawn. With regard to claims 2 and 3, these claims have been canceled.

Applicants respectfully submit that the aforementioned and other deficiencies of Chen (and the other cited but unapplied references) fail to anticipate or render obvious new claims 4-21. At a minimum, Chen fails to disclose or suggest recoding using a secondary radix, a novel and nonobvious innovation set forth at length in the Specification and in the original and presently-submitted claims.

Reconsideration and withdrawal of the § 102(b) rejection of claim 1 are respectfully requested.

Change of Address

Applicants again request that the Patent Office update their records for their Representative, designated below. Attached are copies of Applicants' March 14, 2005 and July 8, 2005 Changes of Correspondence Address requesting such change.

D. Conclusion

In view of the above amendments and remarks, Applicants respectfully submit that the outstanding rejections have been overcome and the case is now in condition for allowance. Applicants, accordingly, respectfully request that a timely Notice of Allowance be issued in this case.

Should the Examiner have any further suggestions or observations that would facilitate further prosecution or allowance of this case, the Examiner is invited to contact Applicants' representative designated below.

Respectfully submitted,

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